



LAWRENCE
LIVERMORE
NATIONAL
LABORATORY

LLNL-TR-521191

Criticality Safety Controls for 55-Gallon Drums with a Mass Limit of 200 grams Pu-239

P. Chou

December 21, 2011

Disclaimer

This document was prepared as an account of work sponsored by an agency of the United States government. Neither the United States government nor Lawrence Livermore National Security, LLC, nor any of their employees makes any warranty, expressed or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or usefulness of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States government or Lawrence Livermore National Security, LLC. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States government or Lawrence Livermore National Security, LLC, and shall not be used for advertising or product endorsement purposes.

This work performed under the auspices of the U.S. Department of Energy by Lawrence Livermore National Laboratory under Contract DE-AC52-07NA27344.



HAZARDS CONTROL DEPARTMENT
Criticality Safety Section

August 8, 2003

CSAM03-167

TO: Stephanie Goodwin, L-623

FROM: Shang-Chih Philip Chou

SUBJECT: Criticality Safety Controls for 55-Gallon Drums with a Mass Limit of 200 grams Pu-239

The following 200-gram Pu drum criticality safety controls are applicable to RHWM drum storage operations:

Mass (Fissile/Pu)

Each 55-gallon drum or its equivalent shall be limited to 200 gram Pu or Pu equivalent.

Moderation

Hydrogen materials with a hydrogen density greater than that (0.133 g H/cc) of polyethylene and paraffin are not allowed. Hydrogen materials with a hydrogen density no greater than that of polyethylene and paraffin are allowed with unlimited amounts.

Interaction

- A spacing of 30" (76 cm) is required between arrays.
- 200-gram Pu drums shall be placed in arrays for 200-gram Pu drums only. (No mingling of 200-gram Pu drums with other drums not meeting the drum controls associated with the 200-gram limit.)

Reflection

No beryllium and carbon/graphite (other than the 50-gram waiver amount) is allowed. (Note: Nat-U exceeding the waiver amount is allowed when its U-235 content is included in the fissile mass limit of 200 grams.)



Geometry

- Drum Geometry: Only 55-gallon drum or its equivalent shall be used.
- Array Geometry: 55-gallon drums are allowed for 2-high stacking. Steel waste boxes may be stacked 3-high if constraint.

**Distribution:**

CSAM File	L-198
John Bowers	L-786
Corky Burgin	L-508
Kerry Cadwell	L-620
Robert Fischer	L-546
Rod Hollister	L-623
Song Huang	L-198
Jack Sims	L-547